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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 113585.00.22	**FOR FURTHER ACTION**	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/US03/28376	International filing date *(day/month/year)* 11 September 2003 (11.09.2003)	Priority date *(day/month/year)*
International Patent Classification (IPC) or national classification and IPC IPC(7): A23K 1/06 and US Cl.: 426/624,630,635,807		
Applicant HASCHEN, THOMAS J		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 6 sheets, including this cover sheet.

   ☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 6 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the report
   - II ☐ Priority
   - III ☐ Non-establishment of report with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
19 May 2004 (19.05.2004)	29 November 2004 (29.11.2004)
Name and mailing address of the IPEA/US Mail Stop PCT, Attn: IPEA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230	Authorized officer Robert Madsen Jean Proctor Paralegal Specialist Telephone No. (571) 272-1700

Form PCT/IPEA/409 (cover sheet)(July 1998)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/US03/28376

I. Basis of the report

1. With regard to the **elements** of the international application:*

☐ the international application as originally filed.

☒ the description:
pages 1-28 as originally filed
pages NONE , filed with the demand
pages NONE , filed with the letter of _____.

☒ the claims:
pages NONE , as originally filed
pages NONE , as amended (together with any statement) under Article 19
pages NONE , filed with the demand
pages 29-32/2 , filed with the letter of 08 October 2004 (08.10.2004)

☒ the drawings:
pages 1-3 , as originally filed
pages NONE , filed with the demand
pages NONE , filed with the letter of _____.

☐ the sequence listing part of the description:
pages NONE , as originally filed
pages NONE , filed with the demand
pages NONE , filed with the letter of _____.

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination(under Rules 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in printed form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages NONE

☐ the claims, Nos. NONE

☐ the drawings, sheets/~~fig~~ NONE

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

** Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).*
*** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.*

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/US03/28376

V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. STATEMENT

Novelty (N)	Claims	5, 34, 36	YES
	Claims	1-4, 6-33, 35	NO
Inventive Step (IS)	Claims	5, 34, 36	YES
	Claims	1-4, 6-33, 35	NO
Industrial Applicability (IA)	Claims	1-36	YES
	Claims	NONE	NO

2. CITATIONS AND EXPLANATIONS
Please See Continuation Sheet

Supplemental Box
(To be used when the space in any of the preceding boxes is not sufficient)

V. 2. Citations and Explanations:
Claims1-4, 6-15,28,29, and 35 lack novelty under PCT Article 33(2) as being anticipated by MEYER

MEYER teaches changing the bypass protein level and digestibility of the by-product nutrient source mixture of brewer/distiller/fermenter (i.e. which would have to be added after fermentation or distillation in order to obtain byproducts of these processes) by adding zinc salts while heating at 200-230°F (See Abstract, Column 2, line 55 to Column 3, line 23, Column 4, line 61 to Column 5, line 16, and Examples), wherein the bypass protein level and digestibility are predetermined by temperature (See the discussion of Example IV), the zinc salts are added either integrated or separate batch/off-line processes (i.e. an integrated process would inherently involve wet end addition to the by-products) with the brewer/distiller/fermenter by-products (See Column 5, lines 17-46 in light of Column 3, lines 19-31), optionally mixing in an extruder (i.e. if pellets are to be formed (Column 5, lines 13-16) and the mixture is subsequently cooled to less than 200°F (Figure 1 and Column 6, lines 5-20 in light of Column 6, lines 50-62)..

Claims 1-4,28, 30, and 31 lack novelty under PCT Article 33(2) as being anticipated by JULIEN
JULIEN teaches changing the bypass protein level, amino acids levels in the bypass protein, and the post ruminal digestibility by adding a nutrient source to distiller solubles, which are wet end distillation by products, at 190-280°F dried (See (Column 1, lines 15-27, Column 4, lines 45-59, Column 5, lines 1-60, Column 7, lines 3-24), wherein the nutritional values are established and nutrient amounts are determined (i.e. based on the experimental results in Columns 8-11 and shown in Tables 1-7), the mixing is done before or prior to drying, and the mixture is cooled to 90°F(Column 7, lines 3-24).

Claims 16-22,24-27,32, and 33 lack novelty under PCT Article 33(2) as being anticipated by MEYER

Regarding claims 16-22,24-26, 32, and 33,MEYER teaches an element to establish target nutritional values for the brewer/distiller/fermenter grain by-products, (Abstract, Column 2, line 55 to Column 3, line 23, wherein the element is the small ribbon mixer used to establish or pre-establish the standards outlined in Example 1), an element to determine the nutriment amounts (e.g. item 13 of Figure 1), an element to mix the nutrient amounts as implied by claim 21 (item 13 of Figure 1), an element to mix with the wet products (item 12 of Figure 1, Column 5, lines 17-46 in light of Column 3, lines 19-31), the mixer is situated before the dryer as implied by claim 22, which may include heating through an extruder as recited in claims 25 and 26 (Column 5, lines 13-16), a dryer to heat and dry that is capable of heating 200-230°F as recited in claim 17-19 (item 14 of Figure 1, Column 5, lines 4-12, Column 5, line 57 to Column 6, line 4), an element for cooling below 200°F as recited in claim 24(Column 6, lines 5-21)and a system suitable for brewer/distiller/fermenter grain by-products would also be suitable for distiller soluble by-products, as recited in claims 32 and 33. Furthermore MEYER teaches an injector to inject the nutrient sources as recited in claims 16 and 32(the pump in Figure 1 between tank 13 and mixer 12).

Regarding claim 20, the mixing is off-line from the distillation or fermentation equipment.

Supplemental Box
(To be used when the space in any of the preceding boxes is not sufficient)

Regarding claim 27, the element to pre-establish target nutritional values is the small ribbon mixer and it would be capable of mixing ingredients to achieve any change in nutrient or nutrient amount.

Claim 23 lacks an inventive step under PCT Article 33(3) as being obvious over MEYER.

Regarding claim 23, the system includes adding the nutrients prior to heating/drying the mixture when using a toaster, but MEYER also teaches heating/drying may be completed in an extruder (Column 5, lines 4-16). Since an extruder is capable of introducing and mixing ingredients in addition to heating and drying, it would have been obvious to modify the system of MEYER and include an extruder in place of the mixer/toaster since an extruder is capable of mixing, heating, and some drying, and this would substitute one apparatus for two apparatuses and simplify the system's operation and control systems.

Claims 19 and 33 lack novelty under PCT Article 33(2) as being anticipated by JULIEN.
JULIEN teaches an element to establish target nutritional values, an element to determine nutrient amounts, an element to mix (i.e. the mixture is blended), and a dryer to heat and dry (Column 7, lines 3-24, and the determination/establish elements are disclosed in the experimental results in Columns 8-11 and shown in Tables 1-7).

Claim 5 and 34 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest changing the amino acid levels in the bypass protein.

Claim 36 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest a method of predicting the amount of bypass protein, post ruminal digestibility, as well as the amino acid level in the bypass protein to meet nutritional values comprising establishing desirable nutritional values, determining nutrients and nutrients amount to attain the desired nutritional values, mixing the nutrients with wet distillers, brewers, or fermenters grain, heating the resulting mixture to 180-250°F to achieve the desired nutritional values, determining the amount of change that takes place in at least one of the bypass protein, post ruminal digestibility, or the amino acid level in the bypass protein of a plurality of samples.

Claims 1-36 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in industry.

Response to Arguments

Applicant argues that MEYER teaches adding a zinc containing solution to a "dry" soybean meal and not "wet". Claim 1 recites " adding predetermined nutrient sources into the wet end distillation or fermentations byproducts after at least one of fermentation and/or distillation". This limitation merely requires a byproduct from wet end distillation or fermentation to which a nutrient source is added after distillation/fermentation. There is no limitation requiring the byproduct to have any particular moisture content prior to adding the nutrient source. Furthermore, the preamble recites "comprising", and thus, the claim does not exclude drying steps. MEYER teaches the invention is practiced with "seed meal, or related seed material, such as brewer's grains or distillers which are by-products of fermentation"(Column 3, lines 20-23). Thus, MEYER teaches a wet end distillation or fermentation byproduct to which the nutrients sources are added after distillation or fermentation.

Applicant further argues that MEYER does not disclose predetermining nutrient levels in anyway whatsoever. The claims recite "adding predetermined nutrient sources" and "changing at least one of bypass protein level (RUP/UIP), amino acid levels in the RUP/UIP, the post ruminal digestibility of the byproduct nutrient source mixture to the predetermined level by changing temperature of the byproduct nutrient source mixture". MEYER teaches adding predetermined nutrient sources (e.g. MEYER selects zinc salts) at an optimum level of 1.0-2.0% (Column 9, lines 1-5) to a byproduct and changing the digestibility and bypass protein level of the byproduct/nutrient source mixture by changing temperature (Column 9, lines 6-30). MEYER teaches the byproduct/zinc salt mixture is heated generally 15-20 minutes at 215-220°F (Column 6, lines 1-5), which according to the Table E in Column 9 does correlates to a particular, or predetermined and changed bypass protein level (relative to a standard).

Applicant argues that since MEYER does not change amino acid levels in the RUP/UIP , then MEYER cannot anticipate claim 1. However, claim 1 recites "changing *at least one of* bypass protein level (RUP/UIP), amino acid levels in the RUP/UIP, the post ruminal digestibility of the byproduct nutrient source mixture to the predetermined level by changing temperature of the byproduct nutrient source mixture". MEYER teaches changing bypass protein level and digestibility by changing the temperature in Table E and thus anticipates claim 1.

Thus, MEYER does anticipate claims 2-4 and 28 at least because 2-4 and 28 depend from and contain features of claim 1, which is anticipated for the reasons stated above.

Supplemental Box
(To be used when the space in any of the preceding boxes is not sufficient)

Applicant argues with respect to claims 6-15, that MEYER does not establish desired nutritional values including bypass protein levels and does not determine nutrients that have lower bypass protein levels than the established desired levels. First, MEYER teaches an *optimum* level of treatment is between 1.0-2.0% nutrient source (Column 9, lines 1-5), and the byproduct/zinc salt mixture is heated generally 15-20 minutes at 215-220°F (Column 6, lines 1-5), which as evidenced by Table E in Example IV, MEYER does inherently teach a predetermined and desired bypass protein level. Second, Table E of Example IV shows the bypass protein levels resulting from amounts 1.0-2.0% zinc salt heated from 15-20 minutes at 215-220°F are higher than the standard (i.e. the zinc salt is added to the byproduct having lower than desirable levels).

Also with respect to claims 6-15, Applicant asserts that MEYER does not take the mixture with different bypass protein levels other than the desirable level and heat the mixture to change the bypass protein level. These steps are not recited in claim 6. Claim 6 requires (1) establishing a desired bypass protein level, which MEYER inherently does by stating the desired level of zinc salt, the time, and temperature of the mixing process in light of Table E, (2) determining the amount of nutrients to add to a byproduct to achieve this desired bypass protein level from a byproduct of lower levels (i.e. MEYER has inherently determined 1.0-2.0% is optimal and shows the resulting byproduct has a level greater than the standard), (3) mixing the zinc salt and byproduct for 10-20 minutes, and (4) heating from 215-220°F to change the bypass protein level (e.g. from the standard stated in Table E) to the desired nutritional value.

Claims 7-15 and 29 depend from claim 6 and are anticipated for the reasons that claim 6 is anticipated.

With respect to JULIEN and claims 1-5,29 and 32, Applicant asserts that JULIEN does not establish any predetermined levels of at least one of bypass protein level (RUP/UIP), amino acid levels in the RUP/UIP, the post ruminal digestibility of the byproduct or change such levels to achieve the predetermined levels. Applicant argues that JULIEN merely states experimental results. However, JULIEN does teach predetermined nutrient sources into wet end distillation or fermentation products to formulate a feed additive. JULIEN also state the amount of the feed additive, or nutrient source, ranges from 0.5- 12 lbs per head per day, depending on the application and species (Column 6, lines 49-56), and shows the effect of the amount (Table 3 and Column 13, line 55 to Column 14, line27). JULIEN further teaches the mixture is heated at 190-280°F (Column 7, lines 3-24) and by changing the temperature to change level of bypass protein and digestibility (Column 11, lines 28-55).

With respect to JULIEN and claims 6,8-11,14,15,29 it is noted that JULIEN fails to teach the original bypass protein level in the byproduct is lower than desired or the original amino acid level in the byproduct is different than desired.

Regarding claims 16,19,32, and 33 with respect to MEYER, Applicant argues that MEYER does not teach an "element" to establish target nutritional values, and that MEYER does not teach setting of a target. Applicant is reminded that claims 16,19,32 and 33 are directed to a "system", not a method. As such the limitations are considered structural items with an intended purpose. An element to establish target nutritional values and an element to pre establish target nutritional values are not structurally distinct and do not imply a different structure. For the reasons stated in the discussion above relative to claim 1, MEYER inherently teaches predetermined/desired/established nutritional values, and the "element" used for obtaining these values is, as stated in the reason statement, the small ribbon mixer used to establish the standards outlined in Example 1. Thus, the claims are anticipated by MEYER.

Regarding claims 19 and 33, Applicant asserts that if JULIEN does not anticipate claim 6, then JULIEN cannot anticipate claims 19 and 33 because the claims 19 and 33 recite system features similar to the method features recited in claim 6. However, Applicant is reminded claims 16,19,32 and 33 are directed to a "system", not a method. As such they are viewed as having structural limitations with intended purposes. An element to establish target nutritional values and an element to pre-establish target nutritional values are not structurally distinct and do not even imply a different structure. Thus, claims 19 and 33 are anticipated by JULIEN.

---------- NEW CITATIONS ----------
US 6,312,710 B1 (JULIEN) 06 November 2001, see entire document.

WHAT IS CLAIMED IS:

1. A method of enhancing the nutrient value of distillers, brewers or fermenters grain byproducts, comprising:

adding predetermined nutrient sources into the wet end of distillation or fermentation byproducts after at least one of fermentation and/or distillation to create a distillation and/or fermentation by-product-nutrient source mixture; and

changing at least one of the bypass protein (RUP/UIP) level, amino acid levels in the RUP/UIP and the post ruminal digestibility of the by-product nutrient source mixture to the predetermined level by changing the temperature of the by-product-nutrient source mixture.

2. The method of claim 1, wherein temperature of the by-product mixture ranges from about 180°F to about 250°F.

3. The method of claim 2, wherein the temperature of the by-product mixture is about 218°F.

4. The method of claim 1, wherein at least two of the bypass protein (RUP/UIP) level, amino acid levels in the RUP/UIP and the post ruminal digestibility of the by-product nutrient source mixture are changed to predetermined levels by changing the temperature of the by-product-nutrient source mixture.

5. The method of claim 1, wherein the bypass protein (RUP/UIP) level, amino acid levels in the RUP/UIP and the post ruminal digestibility of the by-product nutrient source mixture are changed to predetermined levels by changing the temperature of the by-product-nutrient source mixture.

6. A method of producing an improved distillers, brewers or fermenters grain by-product, comprising:

establishing desirable nutritional values, including RUP/UIP levels and/or RUP/UIP amino acid levels for a nutritionally enhanced distillers, brewers or fermenters grain by-product;

determining nutrients and nutrient amounts to be added to the by-product to achieve one or more nutritionally enhanced distillers, brewers or fermenters grain by-products that have at least one of lower RUP/UIP and different RUP/UIP amino acid levels, than the established desirable values thereof;

mixing determined amounts of nutrients with wet distillers, brewers or fermenters grain; and

heating the mixture of wet distillers grains and nutrients to achieve a by-product temperature between from about 180°F to about 250°F to change at least one of the bypass protein (RUP/UIP) level, amino acid levels in the RUP/UIP and the post ruminal digestibility of the mixture to achieve the established desirable nutritional values.

7. The method of claim 6, wherein the ~~pre~~determined nutrient amounts are mixed with wet distillers, wet brewers or wet fermenters grain in an off-line mixer.

8. The method of claim 6, wherein the ~~pre~~determined nutrient amounts are premixed prior to being mixed with the wet distillers, wet brewers or wet fermenters grain.

9. The method of claim 6, wherein the ~~pre~~mixed nutrient amounts are added to the wet distillers, wet brewers or wet fermenters grain prior to drying.

10. The method of claim 6, wherein the ~~pre~~determined nutrient amounts are added to the wet distillers, wet brewers or wet fermenters grains both before being dried and while being dried.

11. The method of claim 6, further comprising cooling the mixture to reach a temperature below about 200°F.

12. The method of claim 6, further including extruding in the process.

13. The method of claim 12, further including applying heat to the mixture while extruding the mixture.

14. The method of claim 6, wherein at least two of the bypass protein (RUP/UIP) level, amino acid levels in the RUP/UIP and the post ruminal digestibility of the mixture are changed.

15. The method of claim 6, wherein desirable nutritional values are established for crude protein, total amino acids, fat fiber, minerals, a ruminant animal bypass protein(RUP/UIP) range, amino acids in the RUP/UIP and post ruminal digestibility of the RUP/UIP

16. A system for enhancing the nutrient value of distillers, brewers or fermenters grain byproducts, comprising:

an injector to inject predetermined nutrient sources into the wet end of distillers, brewers or fermenters grain distillation or fermentation byproduct creating process after at least one of a fermentation process and a distillation process to create a by-product-nutrient source mixture; and

a heater to apply heat to raise the temperature of and dry the by-product-nutrient source mixture to change the ruminant animal bypass protein of the by-product nutrient source mixture to predetermined levels.

17. The system of claim 16, wherein the heater applies heat to achieve a by-product temperature in a range of from about 180°F to about 250°F.

18. The system of claim 16, wherein the temperature is about 218°F.

19. A system to produce an improved distillers, brewers or fermenters grain by-product, comprising:

an element to pre establish target nutritional values for a nutritionally enhanced distillers grain by-product;

an element to determine nutrients and nutrient amounts to be added to the distillers, brewers or fermenters by-product that has a lower RUP/UIP than what is needed to achieve the nutritionally enhanced distillers, brewers, or fermenters grain by-product that will meet the pre-established target nutritional values after processing.

an element to mix the determined amounts of nutrients with wet distillers, brewers or fermenters grains; and

a dryer to heat and dry the mixture of wet distillers, brewers or fermenters grains and nutrients to achieve a by-product temperature between from about 180°F to about 250°F to change the bypass protein (RUP/UIP) level, amino acid levels in the RUP/UIP and the post ruminal digestibility of the mixture to meet the pre established target nutritional values.

20. The system of claim 19, further comprising

a mixer to mix the ~~pre~~determined nutrient amounts with wet distillers, brewers or fermenters grains off-line.

21. The system of claim 19, wherein the ~~pre~~determined nutrient amounts are premixed prior to being mixed with the wet distillers, brewers or fermenters grains.

22. The system of claim 21, wherein the ~~pre~~mixed nutrient amounts are added to the wet distillers, brewers or fermenters grains prior to drying.

23. The system of claim 21, wherein the ~~pre~~determined nutrient amounts are added to the wet distillers, brewers or fermenters grains both before being dried and while being dried.

24. The system of claim 19, further comprising an element to cool the mixture to reach a temperature below about 200°F.

25. The system of claim 19, further including an extruder to extrude the mixture.

26. The system of claim 19, wherein heat is applied heat to the mixture while the mixture is in the extruder.

27. The system of claim 19, wherein the target nutritional values include crude protein, total amino acids, fat fiber, minerals, a ruminant animal bypass protein(RUP/UIP) range, amino acids in the RUP/UIP and post ruminal digestibility of the RUP/UIP, and the nutrients and nutrient amounts to be added that may be added are of different RUP/UIP amino acid levels, known crude protein, total amino acid, fat, fiber mineral and energy levels.

28. A feed or feed supplement made by the method of claim 1.

29. A feed or feed supplement made by the method of claim 6.

30. A method of enhancing the nutrient value of distillers solubles, comprising:

adding predetermined nutrient sources into the distillers solubles to create a distillation solubles by-product-nutrient source mixture; and

changing at least one of the bypass protein (RUP/UIP) level, amino acid levels in the RUP/UIP and the post ruminal digestibility of the by-product nutrient source mixture to predetermined levels by changing the temperature of the by-product-nutrient source mixture.

31. A method of producing an improved distillers solubles by-product, comprising:

establishing target nutritional values for a nutritionally enhanced distillers solubles by-product;

determining nutrients and nutrient amounts to be added to the by-product to achieve nutritionally enhanced distillers, brewers or fermenters grain by-product that have at least one of lower RUP/UIP, different RUP/UIP amino acid levels, known crude protein , total amino acid, fat, fiber mineral and energy levels to achieve nutritionally

enhanced distillers, brewers or fermenters grain by-product that will meet the pre-established target nutritional values after processing.

mixing determined amounts of nutrients with the distillers solubles; and

heating the mixture of distillers solubles and nutrients to achieve a by-product temperature between from about 180°F to about 250°F to change at least one of the bypass protein (RUP/UIP) level, amino acid levels in the RUP/UIP and the post ruminal digestibility of the mixture to meet the pre established target nutritional values.

32. A system for enhancing the nutrient value of distillers solubles, comprising:

means to inject predetermined nutrient sources into the distillers solubles creating process to create a by-product-nutrient source mixture;

means to predetermine desired levels of ruminant animal bypass protein; and

means to apply heat to raise the temperature of and dry the by-product-nutrient source mixture to change the ruminant animal bypass protein of the by-product nutrient source mixture to the predetermined levels.

33. A system to produce an improved distillers solubles by-product, comprising:

means to establish target nutritional values for a nutritionally enhanced distillers solubles by-product;

means to determine nutrients and nutrient amounts to be added to the distillers solubles by-product that has a lower RUP/UIP than needed to achieve the nutritionally enhanced distillers, brewers, or fermenters grain by-product that will meet the pre-established target nutritional values after processing.

mixing means to mix the determined amounts of nutrients with the distillers solubles; and

drying means to heat and dry the mixture of distillers solubles and nutrients to achieve a by-product temperature between from about 180°F to about 250°F to change the bypass protein (RUP/UIP) level, amino acid levels in the RUP/UIP and the post ruminal digestibility of the mixture to meet the pre established target nutritional values.

34. The method of claim 6, wherein all three of the bypass protein (RUP/UIP) level, amino acid levels in the RUP/UIP and the post ruminal digestibility of the mixture are changed.

35. A method of enhancing the nutrient value of distillers, brewers or fermenters grain byproducts, comprising:

adding predetermined nutrient sources into the wet end of distillation or fermentation byproducts after at least one of fermentation and/or distillation to create a distillation and/or fermentation by-product-nutrient source mixture;

predetermining a desired level of at least one bypass protein (RUP/UIP), amino acid level s in the RUP/UIP and the post ruminal digestibility of the nutrient source mixture; and

changing at least one of the bypass protein (RUP/UIP) level, amino acid levels in the RUP/UIP and the post ruminal digestibility of the by-product nutrient source

mixture to the predetermined level by changing the temperature of the by-product-nutrient source mixture.

36. A method of predicting the amount of the bypass protein (RUP/UIP) level, amino acid levels in the RUP/UIP and the post ruminal digestibility of the mixture to meet the pre established target nutritional values set forth in the last step of claim 19, comprising:

performing the method of claim 6 for a plurality of mixture samples; and

determining the amount of change that takes place in at least one of the bypass protein

level, amino acid level in the bypass protein and the post ruminal digestibility of the plurality of sample mixtures.